



Cambridge IGCSE™

BIOLOGY

0610/23

Paper 2 Multiple Choice (Extended)

May/June 2022

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

This document has **12** pages.

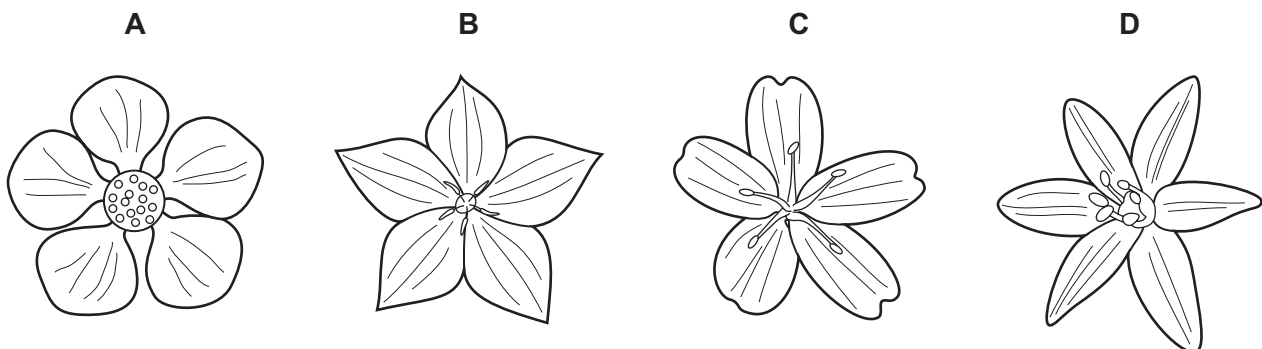


- 1 All living organisms release energy from nutrient molecules within their cells.

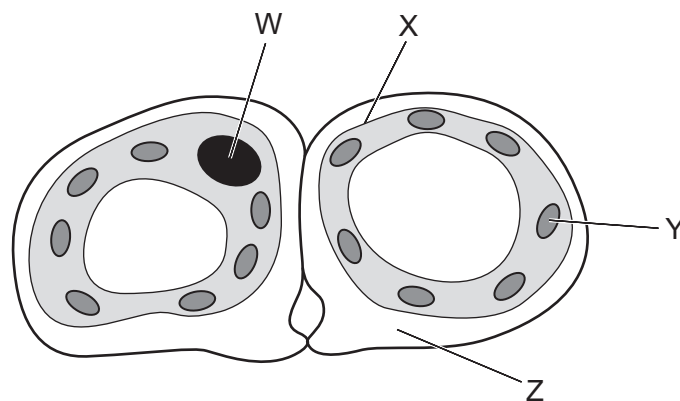
What is the name of this characteristic?

- A growth
- B nutrition
- C respiration
- D sensitivity

- 2 Which diagram shows a flower from a monocotyledon?



- 3 The diagram shows a cross-section through two guard cells of a leaf.



Which labelled structures would also be found in an animal cell?

- A W and X
- B X and Y
- C Y and Z
- D Z and W

- 4 Which level of organisation is shown by the heart of a mammal?

- A a cell
- B a tissue
- C an organ
- D an organ system

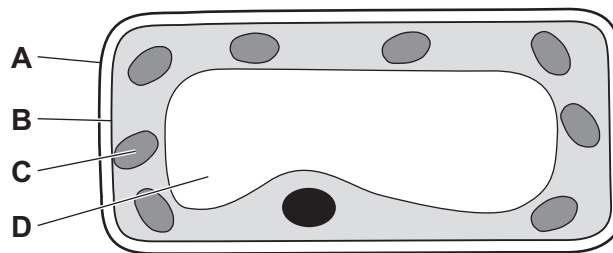
- 5 Female moths release chemicals into the air. Male moths detect these chemicals and fly towards the females.

How do the chemicals spread through the air?

- A active transport
- B diffusion
- C osmosis
- D transpiration

- 6 The diagram shows a section through a mesophyll cell of a leaf.

Which part is partially permeable?



- 7 What are the smaller basic units of starch and glycogen molecules?

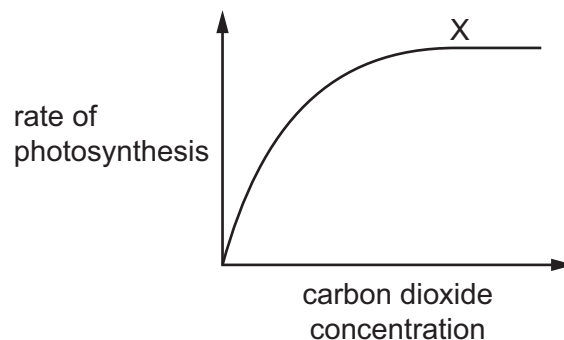
	starch	glycogen
A	amino acids	fatty acids and glycerol
B	amino acids	glucose
C	glucose	fatty acids and glycerol
D	glucose	glucose

- 8 DNA is made up of1..... strands coiled together. The strands contain chemicals called2..... . These chemicals form3..... , A pairing with T and C pairing with G.

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	three	amino acids	cross-links
B	two	bases	cross-links
C	three	bases	proteins
D	two	amino acids	proteins

- 9 What is the correct definition of an enzyme?
- A a carbohydrate that functions as a biological catalyst
 - B a protein that functions as a biological catalyst
 - C a substance that is changed by the reaction
 - D a substance made of fats that changes the rate of a reaction
- 10 Which statement describes the effect of temperature on enzymes?
- A High temperatures denature enzymes making it difficult for substrate molecules to fit into the active site.
 - B High temperatures denature enzymes making it easy for substrate molecules to fit into the active site.
 - C Low temperatures denature enzymes making it difficult for substrate molecules to fit into the active site.
 - D Low temperatures denature enzymes making it easy for substrate molecules to fit into the active site.
- 11 The graph shows the rate of photosynthesis at different carbon dioxide concentrations.



What could be the limiting factor of photosynthesis at X on the graph?

- A oxygen
- B carbon dioxide
- C glucose
- D light intensity

12 The list shows features of a plant leaf.

- 1 air spaces between spongy mesophyll cells
- 2 chloroplasts in mesophyll cells
- 3 contains a natural insecticide
- 4 xylem vessels close to mesophyll cells

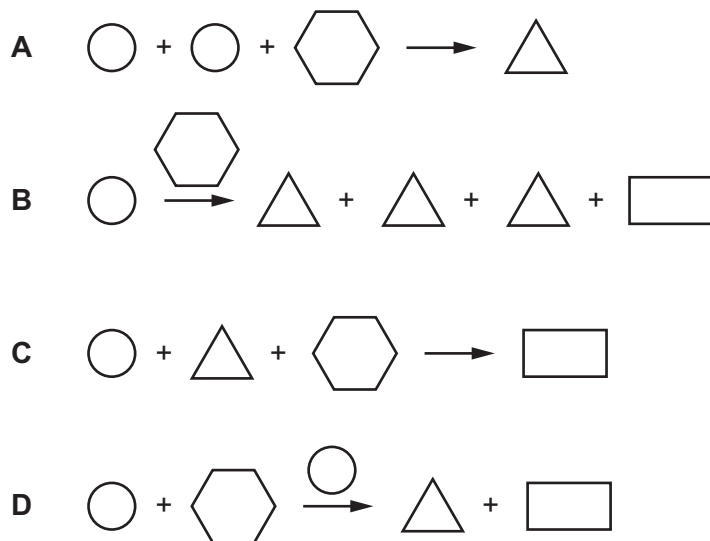
Which features are adaptations for photosynthesis?

- A** 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

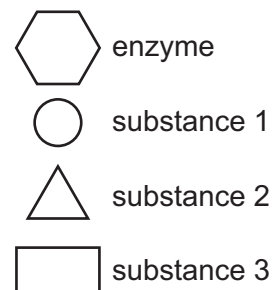
13 Which nutrient is required to prevent scurvy?

- A** calcium
B iron
C vitamin C
D vitamin D

14 Which diagram represents the action of lipase?

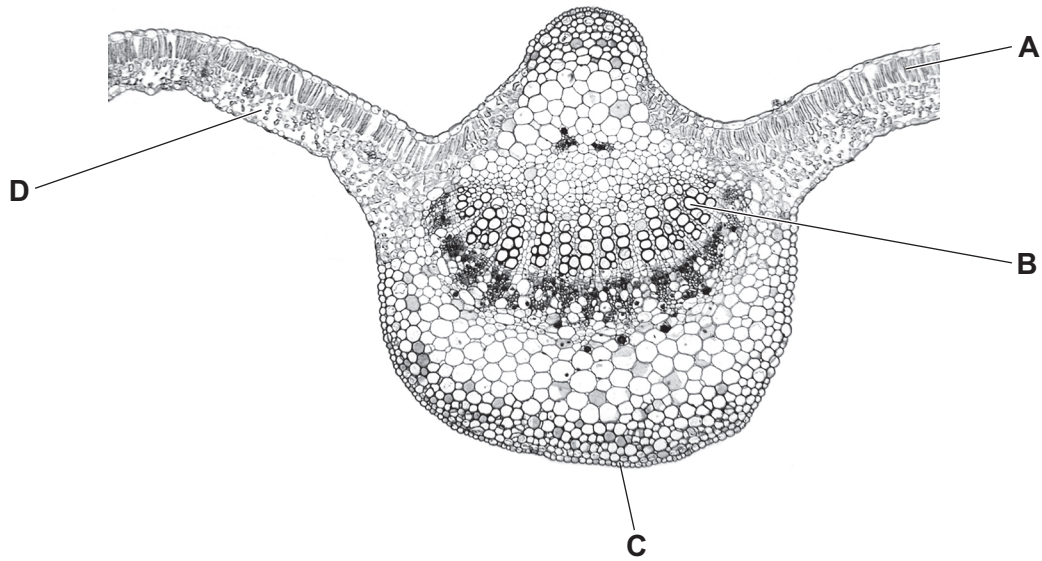


key



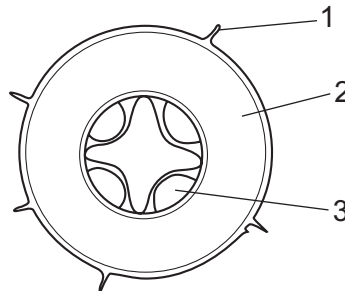
15 The image shows a cross-section of part of a leaf.

Which labelled structure is the xylem?



16 The diagram shows a cross-section of a root.

Three regions of the root are numbered.



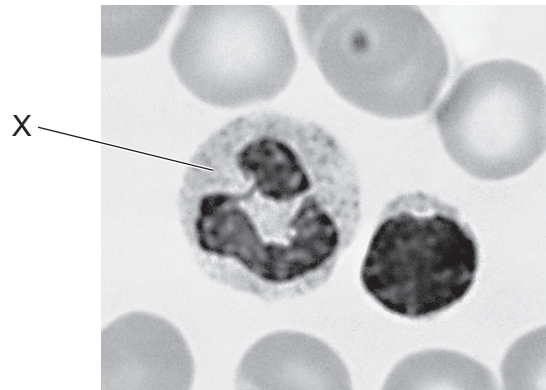
Which regions contain cells through which water must pass to reach the xylem?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 2 and 3 only **D** 2 only

17 In a double circulation, what is the role of the right side of the heart?

- A** to receive oxygenated blood from the body and to pump oxygenated blood to the lungs
B to receive oxygenated blood from the body and to pump deoxygenated blood to the lungs
C to receive deoxygenated blood from the body and to pump oxygenated blood to the lungs
D to receive deoxygenated blood from the body and to pump deoxygenated blood to the lungs

18 The photomicrograph shows some human blood cells.



What is the name of cell X and what is its function?

	name	function
A	lymphocyte	produces antibodies
B	lymphocyte	engulfs pathogens
C	phagocyte	produces antibodies
D	phagocyte	engulfs pathogens

19 Three statements about immune responses are listed.

- 1 Antigens trigger an immune response which produces antibodies.
- 2 Memory cells are produced.
- 3 Antibodies are acquired from another individual.

Which statements are correct when describing active immunity?

A 1 only **B** 1 and 2 only **C** 2 and 3 only **D** 1, 2 and 3

20 Which row shows the action of muscles during inspiration?

	internal intercostal muscles	external intercostal muscles	diaphragm
A	contract	relax	relax
B	contract	relax	contract
C	relax	contract	relax
D	relax	contract	contract

21 Carbon dioxide is produced by aerobic respiration.

How many molecules of carbon dioxide are produced from the aerobic respiration of three molecules of glucose?

- A** 3 **B** 6 **C** 12 **D** 18

22 Which statements describe how an oxygen debt is removed after vigorous exercise?

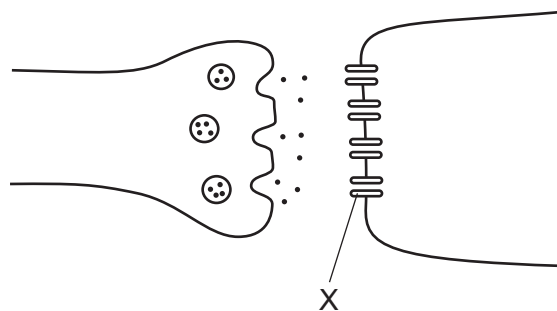
- 1 Lactic acid is transported to the liver.
- 2 Lactic acid is respired aerobically.
- 3 Heart rate stays high to remove lactic acid from the muscles.

- A** 1 and 2 only **B** 1 and 3 only **C** 1, 2 and 3 **D** 2 and 3 only

23 Which statement about urea is correct?

- A** Amino acids are transported to the kidneys where they are converted to urea.
B Urea travels from liver cells to the kidneys where it is filtered out of the blood.
C Liver cells break down proteins to amino acids which are then converted to urea in the kidneys.
D Urea is made in the kidneys and then removed from the body by the liver.

24 The diagram shows the junction between two neurones.

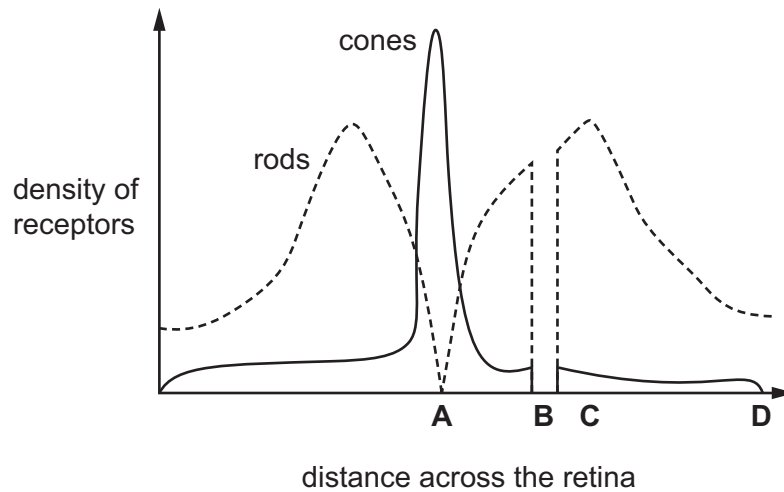


What is labelled at X?

- A** neurotransmitter
B vesicle
C neurotransmitter receptor molecule
D synaptic cleft

- 25 The diagram shows the density of rods and cones across a section of the retina.

What is the position of the fovea?



- 26 What is the synthetic plant hormone 2,4-D used for?

- A genetic engineering
- B inhibiting phototropism
- C killing weeds
- D promoting germination

- 27 Which statement about asexual reproduction would be a disadvantage for a farmer growing crop plants?

- A Desirable qualities are shown throughout the crop.
- B No pollinators are required.
- C Only one parent plant is required so growth is rapid.
- D All of the crop plants have the same risk of disease.

- 28 The diagram shows an abnormal sperm cell.



Why would the abnormal sperm cell be unable to fertilise an egg?

- A It has no acrosome so is unable to digest the jelly coat of the egg.
- B It has no mitochondria so lacks energy to swim to the egg.
- C It has no flagellum so cannot swim to the egg.
- D It has no nucleus so cannot fuse with the egg.

- 29** One type of contraceptive pill contains progesterone and oestrogen. Some effects of the pill are listed.

- 1 inhibit FSH production
- 2 inhibit LH production
- 3 inhibit thickening of the uterus wall

Which prevent the development and the release of an egg cell?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 2 and 3 only **D** 3 only

- 30** Some fruit flies have orange eyes and others have red eyes.

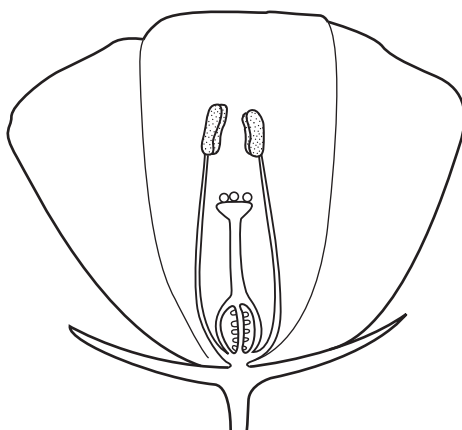
If two orange-eyed fruit flies are crossed, their offspring always have orange eyes.

If two red-eyed fruit flies are crossed, their offspring can have orange eyes or red eyes.

What can be concluded from these observations?

- A** The allele for orange eyes is dominant.
B The allele for orange eyes is recessive.
C The alleles for orange and red eyes are codominant.
D This is an example of sex linkage.

- 31** The diagram shows a section of a flower that has been cross-pollinated.



Which statements about this flower are correct?

- 1 The pollen produced by this flower will be genetically different from the pollen on the stigma.
- 2 The pollen was carried to the stigma by wind.
- 3 This flower is insect-pollinated because the stigma is enclosed by the petals.
- 4 The pollen was produced by another flower on the same plant.

- A** 1, 2 and 4 **B** 1 and 3 **C** 3 only **D** 2 and 4 only

- 32** A woman with normal colour vision is a carrier for the colour blindness allele (X^BX^b). She has a male child with a man who has normal colour vision (X^BY).

What is the chance of the male child being colour-blind?

- A** 0% **B** 25% **C** 50% **D** 100%

- 33** Sickle cell anaemia is a genetic disorder which results in severe illness in homozygous individuals. In some human populations, being heterozygous can be beneficial.

What could be the reason for this?

- A** Heterozygous individuals are not affected by the disorder.
B Heterozygous individuals are more resistant to malaria.
C The disorder is caused by a dominant allele.
D The disorder is sex-linked.

- 34** Which statement about selective breeding is correct?

- A** It does not involve humans.
B It involves a struggle for survival.
C It always involves only one parent.
D It involves parents that possess desirable features.

- 35** What is the name of an organism that obtains its energy from dead organic material?

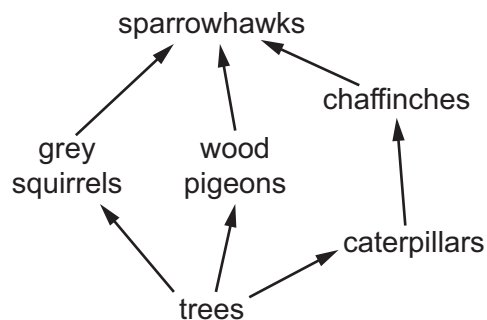
- A** carnivore
B consumer
C decomposer
D herbivore

- 36** A herd of red deer live in a forest that contains snakes and a large variety of birds.

Which group of organisms is an example of a population?

- A** all the animals in the forest
B all the red deer in the forest
C all the organisms in the forest
D all the plants in the forest

- 37 With which kingdoms do bacteria share the same genetic code?
- A animal, plant, fungus and protocist
 - B animal, plant and fungus only
 - C animal and plant only
 - D animal only
- 38 Which process makes use of a genetically engineered organism?
- A using bacteria to produce insulin
 - B using enzymes in biological washing powders
 - C using pectinase in fruit juice production
 - D using yeast to produce ethanol
- 39 What is a reason for conserving plant species?
- A to absorb oxygen from the air
 - B to decrease rainfall
 - C to obtain drugs for medicinal use
 - D to release carbon dioxide into the air
- 40 The food web shows the feeding relationships in a woodland.



If all the chaffinches in the food web die, which effect would this have?

- A The amount of damage to trees will increase.
- B The food supply for grey squirrels will increase.
- C The number of wood pigeons will increase.
- D The population of caterpillars will decrease.